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\* \* \* "The author has no sympathy with those who decry the use of apparatus in botany teaching in secondary schools and who would confine the work of their pupils mainly within the limits of what can be seen with the unaided eye. If the compound microscope plainly reveals things shown only imperfectly by a magnifier and not at all with the naked eye, use the microscope. If iodine solution or other easily prepared reagents make evident the existence of structures or substances not to be detected without them, then use the reagents." \* \* \* "When the university professor tells the teacher that he ought not to employ the ordinary appliances of elementary biological investigation in the school laboratory because the pupils cannot intelligently use them, the teacher is forced to reply that the professor himself cannot intelligently discuss a subject of which he has no personal knowledge." It is evident from the foregoing that the two authors approach the task of outlining the work for the pupil in the secondary schools with very different ideas as to what may be and should be done.

The book contains three parts, viz., 'Structure, Function and Classification of Plants,' 'Ecology, or Relations of Plants to the World about Them,' 'Key and Flora.' The first part begins with the seed and its germination, followed by chapters on the movements, development and morphology of the seedling, roots, stems, buds, leaves, flowers and fruits. In all this there are many physiological experiments, as well as much work with the compound microscope, one short chapter on protoplasm and its properties being interpolated. We have illustrated here, also, the usual exaggerated emphasis too commonly given to the flowering plants, which have 235 pages given to them as against but 63 pages for the slime moulds, bacteria, fresh-water and marine algæ, fungi, lichens, bryophytes, ferns and their allies. The second part is ecological, and follows the usual German treatment of this subject. It contains much interesting information, and pretty and suggestive pictures, but we do not look for much scientific training from the pupil's study of these chapters. At best the pupil will obtain but a very general and vague

notion of the many things referred to here. Some serious errors mar this portion of the book, as in the treatment of 'plant formations' and 'prairies' on page 310.

The 'Flora' is much like most other manuals for beginners, which are made easy by the device of omitting certain families, which among teachers are reputed to be quite too difficult for the young student. It includes seed plants only.

CHARLES E. BESSEY.

THE UNIVERSITY OF NEBRASKA.

*Text-Book of the Embryology of Invertebrates.* By DR. E. KORSCHULT and DR. K. HEIDER. Translated from the German by MATILDA BERNARD. Revised and edited with additional notes by MARTIN F. WOODWARD. Vol. IV., Amphineura Lamellibranchia, Solenoconcha, Gastropoda Cephalopoda, Tunicata, Cephalochorda. London, Swan, Sonnenschein & Co., Ltd.; New York, The Macmillan Co. 1900. 18s.

This is the concluding volume of the somewhat tardy translation of Korschelt and Heider's standard 'Lehrbuch der vergleichenden Entwicklungsgeschichte der wirbellosen Thiere' 1893. As the editor notes in the preface, invertebrate embryology has made immense advances during the last eight years; thus a mere translation of the thorough and scholarly German work would fail to give an adequate account of the present state of knowledge. The translation itself by Matilda Bernard is a very faithful rendering into good English of the original. But the separation of the offices of translator and editor has necessarily limited the revision largely to numerous footnotes and some interpolations. This has the decided defect of preserving conspicuously all that later researches have shown to be errors in the original German edition, and of relegating the corrections to subordinate paragraphs or footnotes in small type easily overlooked by the average student. Thus, to take but a single example, the account of the cleavage of the lamellibranch ovum in the original has been shown to be incorrect, and it is illustrated by diagrams that faithfully and forcibly confirm the error. Yet both are given literally in the translation, and it would re-

quire one already versed in the literature to extract the truth from the footnote revision. Even, however, if the student succeeds in this, he will soon be confused by the plain unrevised statement on p. 106 that the course of cleavage is different in lamellibranchs and gastropods, whereas the recent work has demonstrated a fundamental similarity. It is also to be regretted that the editor should, apparently, have felt unable to replace some of the older figures with more accurate recent ones; not a single figure from the newer works is introduced.

A feature of the revision that will be heartily welcomed is the appendices to the lists of literature, in which the works published since 1893 are included. An important omission from the usually full and accurate lists is that of Heath's valuable paper on *Ischnochiton*, the more noticeable from the scantiness of the literature of the embryology of the *Amphineura*.

Misprints are not common, but it is rather a serious one that credits Hatschek's figures of the cleavage of *Amphioxus* given on p. 537, to Salensky. The present writer finds his initials once F. K. and again F. H., which arouses the suspicion that others also may have ground for complaint.

Take it all in all, the book is a good translation of the standard work on the subject, and the revision will at least suffice to guide the serious student to the more recent literature.

F. R. L.

*The Play of Man.* By KARL GROOS. Translated by ELIZABETH L. BALDWIN, with a preface by J. MARK BALDWIN. New York, Appleton & Co. 1901. Pp. 412. Price, \$1.50.

This is not a drama, as the ambiguous title might signify, but a scientific treatise on sport and pastime, the performance of life's activities not for serious purposes, but for the solitary or cooperative pleasure in them. The author includes in his term the playful activity of the sensory apparatus in feeling, temperature, taste, smell, hearing and sight; the playful use of the motor apparatus, and the playful use of the higher mental powers. His second order of play is *socionomic*, that is, it takes two or more

to fight, play chess, torment, haze, court, cooperate in diversion. The facts and results of over play and diseased play are not neglected.

Part III. is devoted to theoretical explanation of sport, the author finding its groundwork in the following:

1. The discharge of superabundant vigor—the physiological cause.

2. Activities of ancestors wrought in their children in the form of hereditary predispositions—the biological cause.

3. Pleasurableness and freedom from purpose—the psychological cause.

4. The enjoyment of imitating what produces agreeable or intense feelings—the esthetic cause.

5. The strengthening of the social tie—the sociological cause.

The closing pages are devoted to the relation of play to pedagogics. We have only space to quote one sentence, "At school one should learn to work, and he who does everything playfully will always remain a child." The reader will find throughout the work a becoming modesty in view of a new science, and a goodly portion of playfulness to relieve the monotony of dull classification.

O. T. M.

*Text-book of Inorganic Chemistry.* By VICTOR VON RICHTER. Edited by PROFESSOR H. KLINGER, University of Königsberg. Authorized translation by EDGAR F. SMITH, Professor of Chemistry in the University of Pennsylvania, assisted by WALTER T. TAGGART, Instructor in Chemistry. Fifth American from the tenth German edition. Carefully revised and corrected. With sixty-eight engravings on wood and colored lithographic plate of spectra. Philadelphia, P. Blakiston's Sons & Co. 1900. Pp. 430. \$1.75.

The continued popularity of this book is shown by the frequent editions; in this edition, notices on liquid air, the new gases in the atmosphere, and ten pages of physical chemistry introduced into the chapter on metals, indicate careful revision, and a desire to bring the book up to date, without changing its general character. The characteristic of von Richter's book is the great amount of condensed